

## **CHAPTER 6**

### **FUTURE DIRECTIONS IN THE HARPETH RIVER WATERSHED**

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#### **6.1 BACKGROUND.**

The Watershed Management Plan serves as a comprehensive inventory of resources and stressors in the watershed, a recommendation for control measures, and a guide for planning activities in the next five-year watershed cycle and beyond. Water quality improvement will be a result of implementing both regulatory and nonregulatory programs.

In addition to the NPDES program, some state and federal regulations, such as the TMDL and ARAP programs, address point and nonpoint issues. Construction and MS4 stormwater rules (implemented under the NPDES program) are transitioning from Phase 1 to Phase 2. More information on stormwater rules may be found at: <http://www.state.tn.us/environment/wpc/stormh2o/MS4.htm>.

This Chapter addresses point and nonpoint source approaches to water quality problems in the Harpeth River Watershed.

**6.2. COMMENTS FROM PUBLIC MEETINGS.** Watershed meetings are open to the public, and most meetings were represented by citizens who live in the watershed, NPDES permittees, business people, farmers, and local river conservation interests. Locations for meetings were frequently chosen after consulting with people who live and work in the watershed. Everyone with an interest in clean water is encouraged to be a part of the public meeting process. The times and locations of watershed meetings are posted at: <http://www.state.tn.us/environment/wpc/public.htm>.

**6.2.A. Year 1 Public Meeting.** The first Harpeth River Watershed public meeting was held August 19, 1996. The goals of the meeting were to 1)present, and review the objectives of, the Watershed Approach, 2)introduce local, state, and federal agency and nongovernment organization partners, 3)review water quality monitoring strategies, and 4)solicit input from the public.

#### Major Concerns/Comments

- ◆ Potential dams on Harpeth River for water supply and flood control
- ◆ Nonpoint source impacts on Harpeth River
- ◆ Impacts from road construction and resulting development
- ◆ Sediment
- ◆ Herbicide treatment under power lines along streams
- ◆ Litter

**6.2.B. Year 3 Public Meeting.** The second Harpeth River public meeting was held May 20, 1998 at the Williamson County Administrative Complex. The goals of the meeting were to 1)provide an overview of the watershed approach, 2)review the monitoring strategy, 3)summarize the most recent water quality assessment, 4)discuss the TMDL schedule and citizens' role in commenting on draft TMDLs, and 5)discuss BMPs and other nonpoint source tools available through the Tennessee Department of Agriculture 319 Program and NRCS conservation assistance programs.

#### Major Concerns/Comments

- ◆ Problems with complaint tracking and problem resolution
- ◆ Uneven enforcement by TDEC
- ◆ Pollution caused by TDOT
- ◆ Section 118a complaint process is ineffective because of time lag
- ◆ Lynnwood STP expansion
- ◆ TMDLs may not be written before permits are issued

In addition, several individuals requested an opportunity to speak:

Richard Layhew spoke about the contaminated sediment (lead) near streams in the College Grove area.

Robin Lockwood spoke about increased impervious surfaces associated with road construction leading to localized flooding.

Joe McCaleb made a short presentation about water quality problems related to limited TDEC staff and resources.

John Noel spoke about the problems caused by exempting standard agriculture and silviculture practices.

**6.2.C. Special Meeting Held at Citizens' Request.** An additional meeting was held on October 13, 1998 at the Williamson County Administrative Complex.

#### Major Concerns/Comments

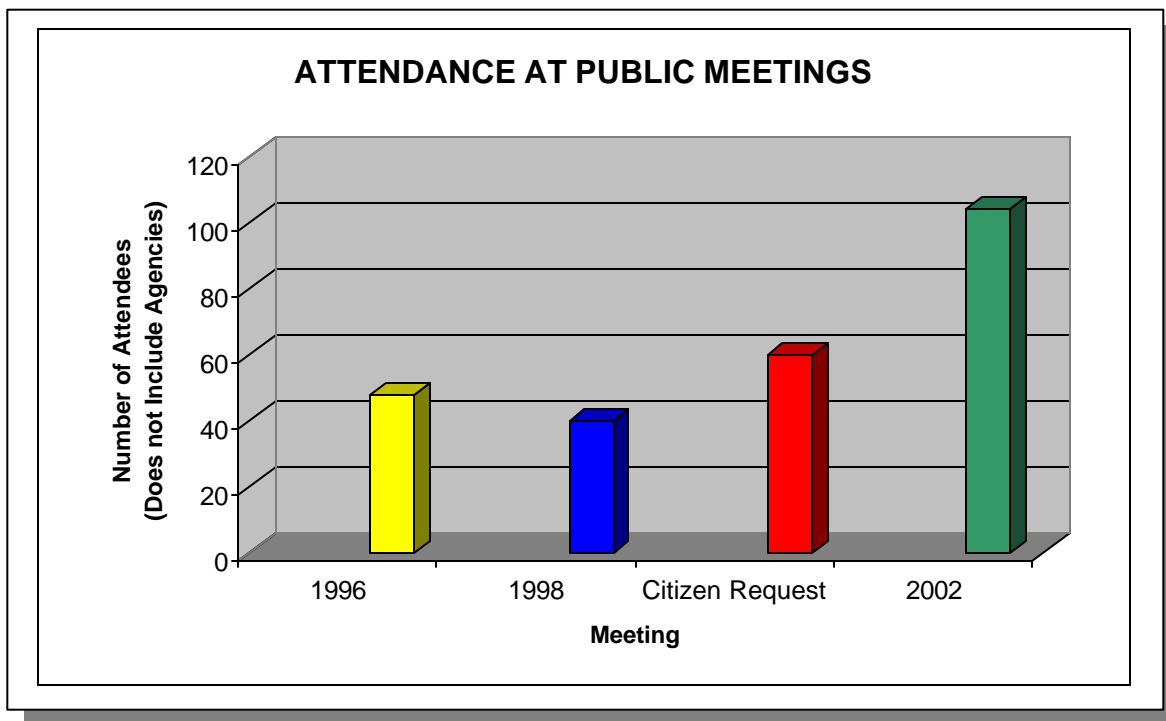
- ◆ Nonpoint sources not subject to regulatory solutions
- ◆ Less apparent biodiversity along Harpeth River and its tributaries
- ◆ Cumulative effects of pollutants
- ◆ Low flow streams receiving effluent from STP
- ◆ Lynnwood STP expansion
- ◆ TMDLs will be written before permits are issued

Gene Cotton (Southwest Williamson County Watershed Association) made a short presentation about his group and appealed to all to join a newly formed Harpeth River Watershed Association.

**6.2.D. Year 5 Public Meeting.** The third Harpeth River Watershed public meeting was held August 27, 2002 at the Williamson County Administrative Complex (Franklin). The meeting featured nine educational stations:

- Draft Watershed Water Quality Management Plan
- Benthic macroinvertebrate samples and interpretation
- Smart Board with interactive GIS maps
- "Watershed Approach" (self-guided slide show)
- "How We Monitor Streams" (self-guided slide show)
- "Why We Do Biological Sampling" (self-guided slide show)
- Landowner Assistance Programs (NRCS and TDA)
- Stormwater Management Programs (Williamson County, Franklin, Metro Nashville)
- Local Citizen Group Displays (HRWA, Franklin High School)

In addition, citizens had the opportunity to make formal comments on the Draft Year 2002 303(d) List.

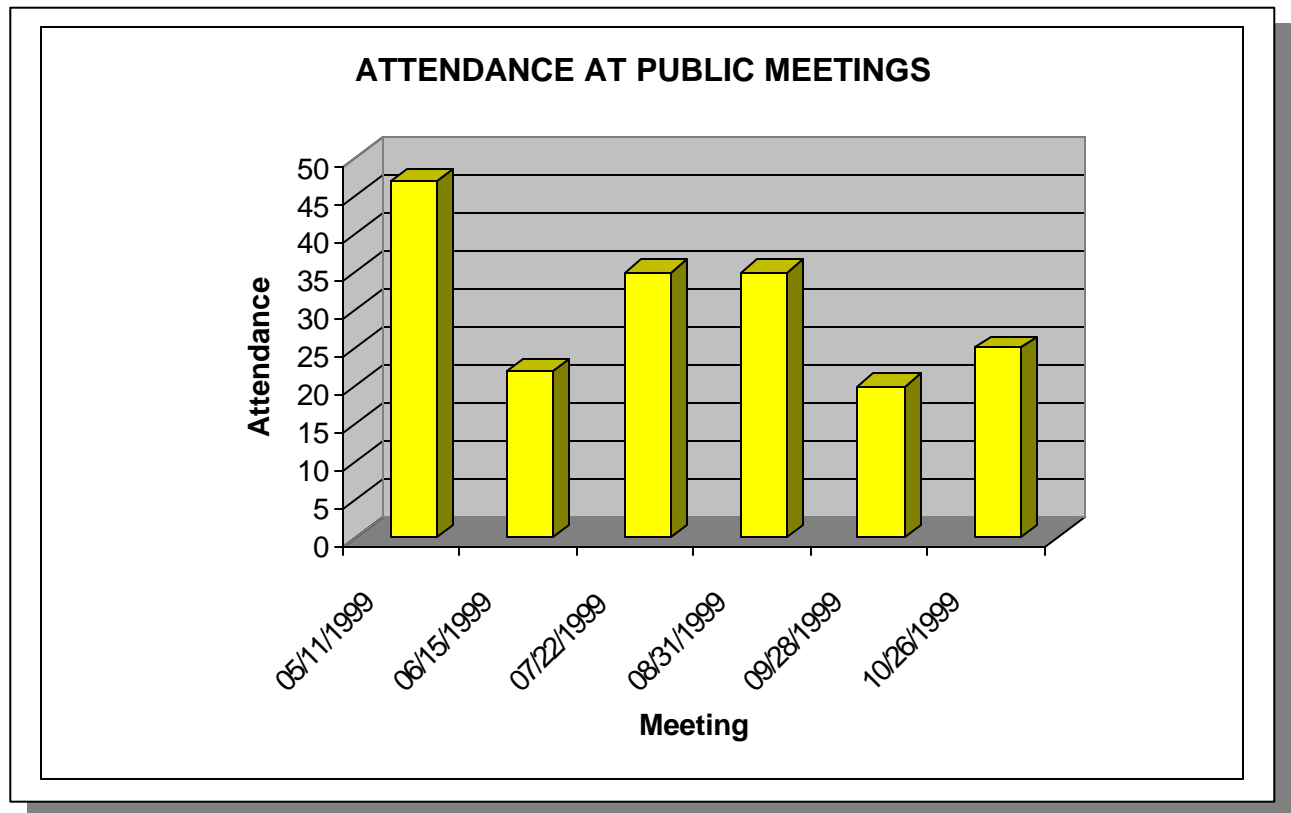


**Figure 6-1. Attendance at Public Meetings in the Harpeth River Watershed.** Attendance numbers do not include agency personnel.



*Figure 6-2. Biologist Jimmy Smith Prepares the Biological Education Station at the Harpeth River Watershed Meeting.*

**6.2.E. Additional Public Meetings.** Additional public meetings were conducted by the Cumberland River Compact and Greater Nashville Regional Council through an EPA 604(b) Planning Grant administered by the Tennessee Department of Environment and Conservation. The goal of the grant was to “build a local forum in the Harpeth River Watershed in which a diverse group of citizenry could meet and discuss the issues and challenges of the watershed...”



**Figure 6.3. Attendance at Harpeth River Watershed meetings conducted by Cumberland River Compact and Greater Nashville Regional Council through a 604(b) Planning Grant administered by TDEC.**

### **6.3. ASSESSMENT OF NEEDS.**

**6.3.A. Point Sources.** Point source contributions to stream impairment are primarily addressed by NPDES and ARAP permit requirements and compliance with the terms of the permits. Notices of NPDES and ARAP draft permits available for public comment can be viewed at <http://www.state.tn.us/environment/wpc/wpcppo/index.html>. Discharge monitoring data submitted by NPDES-permitted facilities may be viewed at [http://www.epa.gov/enviro/html/pcs/pcs\\_query\\_java.html](http://www.epa.gov/enviro/html/pcs/pcs_query_java.html).

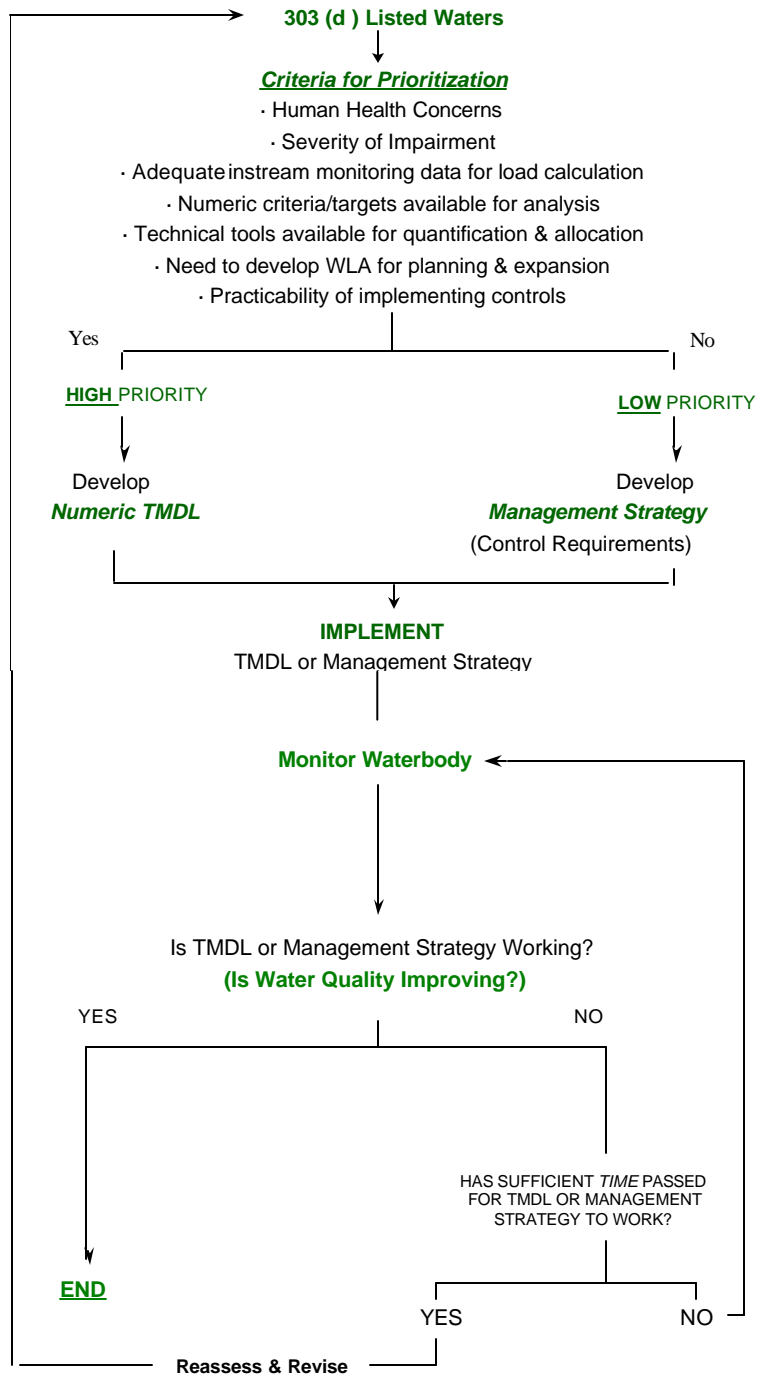
Currently, the mainstem of the Harpeth River in the vicinity of the city of Franklin is the only impacted waterbody within the watershed for which NPDES-permitted point sources are significant contributing factors. The Harpeth River is impacted by excessive nutrients, leading to low dissolved oxygen during low flow conditions, and a substantial portion of this nutrient load comes from the discharge of treated municipal wastewater from three treatment plants: Lynnwood, Cartwright UD, and the Franklin WWTP. Of these, the Franklin plant contributes the largest load by far (although it usually achieves a lower concentration of nutrients per volume than the other two).

All three of the Franklin-area WWTP's will continue to need close monitoring of effluent quality, and be required to utilize the most modern and efficient technologies as they become available. Improvement of pretreatment programs and collection system maintenance and inspections should be continues.

Even if optimal performance of wastewater plants is achieved, non-point source issues in the watershed must also be addressed. Control strategies for the Harpeth River in the vicinity of the Franklin WWTP will need to include a substantial reduction in upstream non-point nutrient/enrichment runoff from the urban and agricultural area it drains. This is vital to increase the available assimilative capacity of the receiving streams, and will require locally implemented development strategies. The City of Franklin built a new wastewater treatment plant in 1999, among other upgrades and modernizations, and this has helped lower nutrient levels in the effluent. In addition, up to a million gallons per day of treated effluent is now used for irrigation at local golf courses, utilizing this rich source of nutrients and diverting some loading from the river.

The purpose of the TMDL program is to identify remaining sources of pollution and allocate pollution control needs in places where water quality goals are still not being achieved. TMDL studies are tools that allow for a better understanding of load reductions necessary for impaired streams to return to compliance with water quality standards. More information about Tennessee's TMDL program may be found at: <http://www.state.tn.us/environment/wpc/tmdl.htm>

TMDLs are prioritized for development based on many factors.



**Figure 6.4. Prioritization scheme for TMDL Development.**



### **6.3.B. Nonpoint Sources.**

Common nonpoint sources of pollution include urban runoff, riparian vegetation removal, and inappropriate land development, agricultural, and road construction practices. Since nonpoint pollution exists essentially everywhere rain falls and drains to a stream, existing point source regulations can have only a limited effect, so other measures are necessary.

Some measures include voluntary efforts by landowners and volunteer groups, while others may involve new regulations. Many agencies, including the Tennessee Department of Agriculture and NRCS, offer financial assistance to landowners for corrective actions (like Best Management Practices) that may be sufficient for recovery of impacted streams. Many nonpoint problems will require an active civic involvement at the local level geared towards establishment of improved zoning guidelines, building codes, streamside buffer zones and greenways, and general landowner education.

State and federal regulations can address some of the contaminants impacting the Harpeth River, and much attention has been addressed to point sources (discharged through a pipe or ditch). However, since the vast majority of impacts to streams in the Harpeth River watershed are nonpoint, or diffuse, in nature, controls of point sources are often not sufficient to protect waters.

The following text describes certain types of impairments, causes, suggested improvement measures, and control strategies. The suggested measures and streams are only examples and efforts should not be limited to only those streams and measures mentioned.

#### **6.3.B.i. Sedimentation.**

**6.3.B.i.a. From Construction Sites.** Construction activities have historically been considered “nonpoint sources.” In the late 1980’s, EPA designated them as being subject to NPDES regulation if more than 5 acres are disturbed. The general permit issued for such construction sites sets out conditions for maintenance of the sites to minimize pollution from stormwater including requirements for inspection of the controls. Also the general permit imposes more stringent inspection and self-monitoring requirements on sites in the watershed of streams that are impaired due to sedimentation.

Construction sites within a sediment-impaired watershed may also have higher priority for inspections by WPC personnel, and are likely to have enforcement actions for failure to control erosion. Some sediment-impaired streams subject to intensive land development in the Harpeth River watershed are Jones Creek and Gum Branch in the Dickson area; Otter Creek and Beech Creek in the Nashville area; Lynnwood Creek, Spencer Creek, Watson Branch, and Fivemile Creek in the Franklin/Brentwood area; and Arrington Creek and Cheatham Branch in the Nolensville area.

Road construction is another form of land disturbance currently affecting several streams in the Harpeth River, in particular the southern loop of the large-scale S.R. 840 project. Impacts to streams associated with road building involve sediment runoff and habitat

alteration, and in general, similar control measures are necessary to mitigate erosion runoff as those for commercial or residential construction sites. In addition, pre-construction planning to avoid multiple stream crossings, steep slopes, and to use bridge spans instead of culvert-and-fill crossings can help minimize impacts. Examples of streams impaired by road construction include Dog Creek, Donelson Creek, Tidwell Branch, Rials Branch, Parker Creek, Goslin Branch, Nails Creek, and Jordan Hollow Branch. Many of these are in the Turnbull Creek drainage near Dickson.

The same additional permit requirements applying to construction sites in sediment-impaired drainages also apply to those within the drainage of high quality waters. The South Fork Harpeth, Kelly Creek (S. Harpeth drainage), and portions of the Harpeth River are examples of high quality streams in the Harpeth River Watershed.

The state's construction stormwater permitting measures are currently required for all sites of 5 acres or more, but may also be required on a site-by-site basis for smaller sites where warranted. Regardless of the size, state regulations direct that no construction site be allowed to cause a condition of pollution.

Due to the explosive population growth within the Harpeth River Watershed during the last decade, sediment erosion and riparian destruction from construction activities have become main sources of stream impairment. The rapid pace and ephemeral nature of these activities have put a substantial strain on the ability of agencies to inspect and monitor these sites adequately. The establishment of local stormwater management agencies within larger urbanized areas over the next couple of years should aid in regulating and controlling runoff from construction activities. Williamson County and the cities of Franklin and Brentwood are currently proposing for, or in the process of developing their own, MS4 (Municipal Separate Storm Sewer System) programs. Part of the mandate for these MS4 programs will be to draft zoning and building codes designed to address sediment pollution. A few municipalities have already put in place progressive developmental regulations, most notably Franklin and Williamson County. In addition, new federal requirements will reduce the size of the sites subject to NPDES construction storm water permitting to one acre.

Additional non-regulatory strategies for controlling sediment runoff for residents to consider include the immediate re-vegetation of any bare area, including ditches beside driveways, and the covering of topsoil piles.

**6.3.B.i.b.** From Channel Alteration and Bank Erosion. Due to past bank and channel alterations and riparian vegetation removal, many streams within the Harpeth River Watershed have unstable and eroding banks. This erosion can release a surprising amount of sediment downstream. Several agencies are working to stabilize portions of stream banks. These include NRCS, TDOT, and TDA. Much of this work involves voluntary, cost-sharing projects with landowners. Some methods or controls that might be necessary to address common problems are:

#### *Voluntary activities*

- Re-establishment of bank vegetation. This is perhaps the most effective means of reducing not only bank erosion and sedimentation, but also a variety of other impacts, including organic enrichment and aggravated flooding. Many impacted streams would benefit from the re-establishment of riparian vegetation, including Newsome Branch, Beech Creek, Lynnwood Branch, Otter Creek in primarily

urbanized areas; and Polk Creek, West Harpeth River, Arrington Creek, Fivemile Creek, and Cheatham Branch in primarily rural areas.

- Establish off-channel watering areas for cattle. Cattle activity can create very destabilized and denuded banks. Several current BMP methods exist for moving watering troughs and feeders back from stream banks, including solar powered pumps, or pond construction. Examples of streams that could benefit would be Murray Branch, Bedford Creek, and Cayce Branch. Where it is not possible to exclude cattle from a creek, effort should be made to limit cattle access to streams to a single point, using fencing or other methods.

#### *Additional strategies*

- Increase efforts in the Master Logger program to recognize impaired streams and require more effective erosion management and road-building practices in silviculture activities.
- Additional restrictions on logging in streamside management zones.
- Better community planning of development impacts on small streams, especially development in rapidly growing areas.
- Local restrictions requiring postconstruction runoff rates to be no greater than preconstruction rates in order to avoid in-channel erosion and downstream flooding.
- Restrictions on impervious surface densities in urbanized areas. Impervious surfaces (parking lots, roads, rooftops) increase runoff rates to streams, causing destabilization and erosion as well as increased pollutant transport.
- Better landowner education on the proper, low-impact methods for clearing of stream and ditch banks *Note: Permits are currently required for any work along streams if water quality is altered.*
- Additional restrictions on multiple road and utility line crossings of streams. This should include the proper sizing and installation of culverts.
- Restrictions on the use of off-highway vehicles on stream banks and in stream channels.

#### **6.3.B.ii. Pathogen Contamination.**

Possible sources of pathogens are inadequate or failing septic tank systems, overflows or breaks in public sewer collection systems, poorly disinfected discharges from sewage treatment plants, and fecal matter in streams and storm drains due to pets, livestock and wildlife. Permits issued by the Division of Water Pollution Control regulate discharges from point sources and require adequate control for these sources. Individual homes are required to have subsurface, on-site treatment (i.e., septic tank and field lines) if public sewers are not available. Septic tank and field lines are regulated by TDEC's Division of Ground Water Protection and delegated county health departments. In addition to discharges to surface waters, businesses may employ either subsurface or surface disposal of wastewater. The Division of Water Pollution Control regulates surface disposal

Other measures that may be necessary to control pathogens are:

#### *Voluntary activities*

- Off-channel watering of livestock or limiting livestock access to streams (see above).
- Proper management of animal waste from feeding operations.

#### *Enforcement strategies*

- Greater enforcement of regulations governing on-site wastewater treatment.
- Timely and appropriate enforcement for non-complying sewage treatment plants, large and small, and their collection systems.
- Identification of Concentrated Animal Feeding Operations not currently permitted, and enforcement of current regulations.

#### *Additional strategies*

- Restrict development in areas where sewer is not available to only those sites with appropriate soils.
- Develop and enforce leash laws and controls on pet fecal material in highly populated areas.
- Greater efforts by sewer utilities to identify leaking lines or overflowing manholes, and more frequent upgrades to reduce infiltration and inflow, or catastrophic failures (examples of affected streams are Spencer Creek and Harpeth River).

### **6.3.B.iii. Excessive Nutrients and/or Dissolved Oxygen Depletion.**

These two impacts are usually listed together because high nutrients often contribute to low dissolved oxygen within a stream. Since nutrients often have the same source as pathogens, the measures previously listed can also address many of these problems. Elevated nutrient loadings are also often associated with urban runoff from impervious surfaces and from fertilized lawns and croplands.

Other sources of nutrients can be addressed by:

#### *Voluntary activities*

- Encourage no-till farming, and the proper rate of fertilizer for the soil and crop.
- Educate homeowners and lawn care companies in the proper application of fertilizers.
- Encourage landowners, developers, and builders to leave stream buffer zones. Streamside vegetation can filter out many nutrients and other pollutants before they reach the stream. These riparian buffers are also vital along livestock pastures. Examples of streams that need buffers to reduce nutrient runoff are Beech Creek, Rattlesnake Branch, Concord Creek, and Kelly Creek (upper Harpeth drainage).
- Use grassed drainageways that can remove fertilizer before it enters streams.
- Use native plants for landscaping since they don't require as much fertilizer and water.

Physical changes to streams can prevent them from providing enough oxygen to biodegrade the materials that are naturally present. A few additional actions can address this problem:

- Maintain shade over a stream. Cooler water can hold more oxygen and retard the growth of algae. Many streams in the Harpeth River watershed suffer from canopy removal.
- Discourage impoundments. Deepwater environments such as ponds and lakes do not aerate water, and often become eutrophic through nutrient buildup, encouraging algae growth. *Note: Permits are required for any work on a stream, including impoundments.*

#### **6.3.B.iv. Toxins and Other Materials.**

Only one area in the Harpeth River watershed is considered significantly polluted by a toxic substance, although many streams are affected by foreign material thrown or dumped into them. A short reach of the Harpeth mainstem near College Grove contains sediments contaminated by lead and other heavy metals—an historic legacy from decades of operation at a nearby battery recycling plant, and improper disposal of wastes generated there. Although these disposal practices ceased years ago, and the water itself is not contaminated, levels in the muddy bottom are still high, and probably will be for many years to come. Fortunately, the lead and other pollutants are effectively sealed off from casual human contact at the bottom of the Harpeth River, and efforts to excavate or dredge these sediments up would only serve to reintroduce them to the environment and carry them, stirred up, farther downstream.

A much greater amount of unsightly, and some toxic, materials enter our streams due to apathy, or lack of civility or knowledge by the public. Litter in roadside ditches, garbage bags tossed over bridge railings, paint brushes washed off over storm drains, and oil drained into ditches are all blatant examples of pollution in streams. Some can be addressed by:

##### *Voluntary activities*

- Providing public education.
- Painting warnings on storm drains indicating connection with a stream. (This would benefit urban streams like Newsome Branch, Beech Creek, the Harpeth River and many of its unnamed tributaries).
- Sponsoring community clean-up days.
- Landscaping of public areas and greenway development.
- Encouraging public surveillance of their streams and reporting of dumping activities to their local authorities.
- Public education concerning dumping into sinkholes, and their connection with groundwater contamination.

##### *Needing regulation*

- Prohibition of illicit discharges to storm drains. (Local MS4 programs will help address this.)
- Litter laws and strong enforcement at the local level.

### 6.3.B.v. Habitat Alteration.

The alteration of the habitat within a stream can have severe consequences. Whether it is the removal of the vegetation providing a root system network for holding soil particles together, the release of sediment, which increases the bed load and covers benthic life and fish eggs, the removal of gravel bars, “cleaning out” creeks with heavy equipment, or the impounding of the water in ponds and lakes, many alterations impair the use of the stream for designated uses. Habitat alteration also includes the draining or filling of wetlands.

Measures that can help address this problem include:

#### *Voluntary activities*

- Organizing stream cleanups removing trash, limbs and debris by hand or winch before they cause blockage.
- Avoiding use of heavy equipment to “clean out” streams.
- Planting vegetation along streams to stabilize banks and provide habitat.
- Encouraging developers to avoid extensive culverting or relocation of streams.

#### *Current regulations*

- Reduce or restrict modification of streams by such means as channelization, culverting, lining, or impounding. (Spicer Branch and a tributary to Jones Creek in the Dickson area would benefit.)
- Require mitigation for impacts to streams and wetlands when modifications are allowed.

#### *Additional Enforcement or Restrictions*

- Increased enforcement may be needed when violations of current regulations occur.
- More restrictive alteration regulations to discourage extensive relocations, impoundment of headwater streams, riprapping of banks, and removal of riparian vegetation. (Trace Creek, Kennedy Creek, Starnes Creek, and Little Harpeth River would benefit.)